

02-09-00

A

Practitioner's Docket No. FORE-57**PATENT**

JC525 U.S. PTO

09/499819

02/08/00

Preliminary Classification:

Proposed Class:

Subclass:

NOTE: "All applicants are requested to include a preliminary classification on newly filed patent applications. The preliminary classification, preferably class and subclass designations, should be identified in the upper right-hand corner of the letter of transmittal accompanying the application papers, for example 'Proposed Class 2, subclass 129.'" M.P.E.P. § 601, 7th ed.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Box Patent Application
Assistant Commissioner for Patents
Washington, D.C. 20231

NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of

Inventor(s): Sivaramakrishna Kuditipudi, Richard K. Shehady

WARNING: 37 C.F.R. § 1.41(a)(1) points out:

"(a) A patent is applied for in the name or names of the actual inventor or inventors.

"(1) The inventorship of a nonprovisional application is that inventorship set forth in the oath or declaration as prescribed by § 1.63, except as provided for in § 1.53(d)(4) and § 1.63(d). If an oath or declaration as prescribed by § 1.63 is not filed during the pendency of a nonprovisional application, the inventorship is that inventorship set forth in the application papers filed pursuant to § 1.53(b), unless a petition under this paragraph accompanied by the fee set forth in § 1.17(f) is filed supplying or changing the name or names of the inventor or inventors."

For (title): SWITCH NAME, IP ADDRESS, AND HARDWARE SERIAL NUMBER
 AS PART OF THE TOPOLOGY DATABASE

CERTIFICATION UNDER 37 C.F.R. § 1.10*

(Express Mail label number is mandatory.)

(Express Mail certification is optional.)

I hereby certify that this New Application Transmittal and the documents referred to as attached therein are being deposited with the United States Postal Service on this date February 8, 2000, in an envelope as "Express Mail Post Office to Addressee," mailing Label Number EL396485519US, addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

Tracey L. Milka

(type or print name of person mailing paper)

Tracey L. Milka

Signature of person mailing paper

WARNING: Certificate of mailing (first class) or facsimile transmission procedures of 37 C.F.R. § 1.8 cannot be used to obtain a date of mailing or transmission for this correspondence.

***WARNING:** Each paper or fee filed by "Express Mail" **must** have the number of the "Express Mail" mailing label placed thereon prior to mailing. 37 C.F.R. § 1.10(b).

"Since the filing of correspondence under § 1.10 without the Express Mail mailing label thereon is an oversight that can be avoided by the exercise of reasonable care, requests for waiver of this requirement will **not** be granted on petition." Notice of Oct. 24, 1996, 60 Fed. Reg. 56,439, at 56,442.

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1. Type of Application

This new application is for a(n)

(check one applicable item below)

- ☒ Original (nonprovisional)
- ☐ Design
- ☐ Plant

WARNING: Do not use this transmittal for a completion in the U.S. of an International Application under 35 U.S.C. § 371(c)(4), unless the International Application is being filed as a divisional, continuation or continuation-in-part application.

WARNING: Do not use this transmittal for the filing of a provisional application.

NOTE: If one of the following 3 items apply, then complete and attach **ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF A PRIOR U.S. APPLICATION CLAIMED** and a **NOTIFICATION IN PARENT APPLICATION OF THE FILING OF THIS CONTINUATION APPLICATION**.

- ☐ Divisional.
- ☐ Continuation.
- ☐ Continuation-in-part (C-I-P).

2. Benefit of Prior U.S. Application(s) (35 U.S.C. §§ 119(e), 120, or 121)

NOTE: A nonprovisional application may claim an invention disclosed in one or more prior filed copending nonprovisional applications or copending international applications designating the United States of America. In order for a nonprovisional application to claim the benefit of a prior filed copending nonprovisional application or copending international application designating the United States of America, each prior application must name as an inventor at least one inventor named in the later filed nonprovisional application and disclose the named inventor's invention claimed in at least one claim of the later filed nonprovisional application in the manner provided by the first paragraph of 35 U.S.C. § 112. Each prior application must also be:

(i) An international application entitled to a filing date in accordance with PCT Article 11 and designating the United States of America; or

(ii) Complete as set forth in § 1.51(b); or

(iii) Entitled to a filing date as set forth in § 1.53(b) or § 1.53(d) and include the basic filing fee set forth in § 1.16; or

(iv) Entitled to a filing date as set forth in § 1.53(b) and have paid therein the processing and retention fee set forth in § 1.21(f) within the time period set forth in § 1.53(f).

37 C.F.R. § 1.78(a)(1).

NOTE: If the new application being transmitted is a divisional, continuation or a continuation-in-part of a parent case, or where the parent case is an International Application which designated the U.S., or benefit of a prior provisional application is claimed, then check the following item and complete and attach **ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED**.

WARNING: If an application claims the benefit of the filing date of an earlier filed application under 35 U.S.C. §§ 120, 121 or 365(c), the 20-year term of that application will be based upon the filing date of the earliest U.S. application that the application makes reference to under 35 U.S.C. §§ 120, 121 or 365(c). (35 U.S.C. § 154(a)(2) does not take into account, for the determination of the patent term, any application on which priority is claimed under 35 U.S.C. §§ 119, 365(a) or 365(b).) For a c-i-p application, applicant should review whether any claim in the patent that will issue is supported by an earlier application and, if not, the applicant should consider canceling the reference to the earlier filed application. The term of a patent is not based on a claim-by-claim approach. See Notice of April 14, 1995, 60 Fed. Reg. 20,195, at 20,205.

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WARNING: When the last day of pendency of a provisional application falls on a Saturday, Sunday, or Federal holiday within the District of Columbia, any nonprovisional application claiming benefit of the provisional application **must** be filed prior to the Saturday, Sunday, or Federal holiday within the District of Columbia. See 37 C.F.R. § 1.78(a)(3).

- ☐ The new application being transmitted claims the benefit of prior U.S. application(s). Enclosed are ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

3. Papers Enclosed

- A. Required for filing date under 37 C.F.R. § 1.53(b) (Regular) or 37 C.F.R. § 1.153 (Design) Application

10 Pages of specification
5 Pages of claims
2 Sheets of drawing

WARNING: DO NOT submit original drawings. A high quality copy of the drawings should be supplied when filing a patent application. The drawings that are submitted to the Office must be on strong, white, smooth, and non-shiny paper and meet the standards according to § 1.84. If corrections to the drawings are necessary, they should be made to the original drawing and a high-quality copy of the corrected original drawing then submitted to the Office. Only one copy is required or desired. For comments on proposed then-new 37 C.F.R. § 1.84, see Notice of March 9, 1988 (1990 O.G. 57-62).

NOTE: "Identifying indicia, if provided, should include the application number or the title of the invention, inventor's name, docket number (if any), and the name and telephone number of a person to call if the Office is unable to match the drawings to the proper application. This information should be placed on the back of each sheet of drawing a minimum distance of 1.5 cm. (5/8 inch) down from the top of the page . . ." 37 C.F.R. § 1.84(c).

(complete the following, if applicable)

- ☐ The enclosed drawing(s) are photograph(s), and there is also attached a "PETITION TO ACCEPT PHOTOGRAPH(S) AS DRAWING(S)." 37 C.F.R. § 1.84(b).
☐ formal
☒ informal

B. Other Papers Enclosed

0 Pages of declaration and power of attorney
1 Pages of abstract
0 Other

4. Additional papers enclosed

- ☐ Amendment to claims
☐ Cancel in this applications claims _____ before calculating the filing fee. (At least one original independent claim must be retained for filing purposes.)
☐ Add the claims shown on the attached amendment. (Claims added have been numbered consecutively following the highest numbered original claims.)
☐ Preliminary Amendment
☐ Information Disclosure Statement (37 C.F.R. § 1.98)
☐ Form PTO-1449 (PTO/SB/08A and 08B)
☐ Citations

- ☐ Declaration of Biological Deposit
- ☐ Submission of "Sequence Listing," computer readable copy and/or amendment pertaining thereto for biotechnology invention containing nucleotide and/or amino acid sequence.
- ☐ Authorization of Attorney(s) to Accept and Follow Instructions from Representative
- ☐ Special Comments
- ☐ Other

5. Declaration or oath (including power of attorney)

NOTE: A newly executed declaration is not required in a continuation or divisional application provided that the prior nonprovisional application contained a declaration as required, the application being filed is by all or fewer than all the inventors named in the prior application, there is no new matter in the application being filed, and a copy of the executed declaration filed in the prior application (showing the signature or an indication thereon that it was signed) is submitted. The copy must be accompanied by a statement requesting deletion of the names of person(s) who are not inventors of the application being filed. If the declaration in the prior application was filed under § 1.47, then a copy of that declaration must be filed accompanied by a copy of the decision granting § 1.47 status or, if a nonsigning person under § 1.47 has subsequently joined in a prior application, then a copy of the subsequently executed declaration must be filed. See 37 C.F.R. §§ 1.63(d)(1)-(3).

NOTE: A declaration filed to complete an application must be executed, identify the specification to which it is directed, identify each inventor by full name including family name and at least one given name, without abbreviation together with any other given name or initial, and the residence, post office address and country or citizenship of each inventor, and state whether the inventor is a sole or joint inventor. 37 C.F.R. § 1.63(a)(1)-(4).

NOTE: "The inventorship of a nonprovisional application is that inventorship set forth in the oath or declaration as prescribed by § 1.62, except as provided for in § 1.53(d)(4) and § 1.63(d). If an oath or declaration as prescribed by § 1.63 is not filed during the pendency of a nonprovisional application, the inventorship is that inventorship set forth in the application papers filed pursuant to § 1.53(b), unless a petition under this paragraph accompanied by the fee set forth in § 1.17(f) is filed supplying or changing the name or names of the inventor or inventors." 37 C.F.R. § 1.41(a)(1).

- ☐ Enclosed
- Executed by

(check all applicable boxes)

- ☐ inventor(s).
- ☐ legal representative of inventor(s).
37 C.F.R. §§ 1.42 or 1.43.
- ☐ joint inventor or person showing a proprietary interest on behalf of inventor who refused to sign or cannot be reached.
- ☐ This is the petition required by 37 C.F.R. § 1.47 and the statement required by 37 C.F.R. § 1.47 is also attached. See item 13 below for fee.

- ☒ Not Enclosed.

NOTE: Where the filing is a completion in the U.S. of an International Application or where the completion of the U.S. application contains subject matter in addition to the International Application, the application may be treated as a continuation or continuation-in-part, as the case may be, utilizing ADDED PAGE FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION CLAIMED.

- ☐ Application is made by a person authorized under 37 C.F.R. § 1.41(c) on behalf of all the above named inventor(s).

(The declaration or oath, along with the surcharge required by 37 C.F.R. § 1.16(e) can be filed subsequently).

- ☐ Showing that the filing is authorized.
(not required unless called into question. 37 C.F.R. § 1.41(d))

6. Inventorship Statement

WARNING: If the named inventors are each not the inventors of all the claims an explanation, including the ownership of the various claims at the time the last claimed invention was made, should be submitted.

The inventorship for all the claims in this application are:

- ☒ The same.

or

- ☐ Not the same. An explanation, including the ownership of the various claims at the time the last claimed invention was made,
☐ is submitted.
☐ will be submitted.

7. Language

NOTE: An application including a signed oath or declaration may be filed in a language other than English. An English translation of the non-English language application and the processing fee of \$130.00 required by 37 C.F.R. § 1.17(k) is required to be filed with the application, or within such time as may be set by the Office. 37 C.F.R. § 1.52(d).

- ☒ English
☐ Non-English
☐ The attached translation includes a statement that the translation is accurate. 37 C.F.R. § 1.52(d).

8. Assignment

- ☒ An assignment of the invention to FORE Systems, Inc.
☐ is attached. A separate ☐ "COVER SHEET FOR ASSIGNMENT (DOCUMENT) ACCOMPANYING NEW PATENT APPLICATION" or ☐ FORM PTO 1595 is also attached.
☒ will follow.

NOTE: "If an assignment is submitted with a new application, send two separate letters—one for the application and one for the assignment." Notice of May 4, 1990 (1114 O.G. 77-78).

WARNING: A newly executed "CERTIFICATE UNDER 37 C.F.R. § 3.73(b)" must be filed when a continuation-in-part application is filed by an assignee. Notice of April 30, 1993, 1150 O.G. 62-64.

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9. Certified Copy

Certified copy(ies) of application(s)

Country	Appln. No.	Filed
Country	Appln. No.	Filed
Country	Appln. No.	Filed

from which priority is claimed

☐ is (are) attached.☐ will follow.

NOTE: The foreign application forming the basis for the claim for priority must be referred to in the oath or declaration. 37 C.F.R. § 1.55(a) and 1.63.

NOTE: This item is for any foreign priority for which the application being filed directly relates. If any parent U.S. application or International Application from which this application claims benefit under 35 U.S.C. § 120 is itself entitled to priority from a prior foreign application, then complete item 18 on the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED.

10. Fee Calculation (37 C.F.R. § 1.16)**A. ☒ Regular application**

CLAIMS AS FILED			
Number filed	Number Extra	Rate	Basic Fee 37 C.F.R. § 1.16(a) \$760.00
Total			
Claims (37 C.F.R. § 1.16(c))	25 - 20 = 5	× \$ 18.00	90.00
Independent			
Claims (37 C.F.R. § 1.16(b))	3 - 3 = 0	× \$ 78.00	0.00
Multiple dependent claim(s), if any (37 C.F.R. § 1.16(d))		+ \$260.00	

☐ Amendment cancelling extra claims is enclosed.☐ Amendment deleting multiple-dependencies is enclosed.☐ Fee for extra claims is not being paid at this time.

NOTE: If the fees for extra claims are not paid on filing they must be paid or the claims cancelled by amendment, prior to the expiration of the time period set for response by the Patent and Trademark Office in any notice of fee deficiency. 37 C.F.R. § 1.16(d).

Filing Fee Calculation

\$ 780.00

B. ☐ Design application

(\$310.00—37 C.F.R. § 1.16(f))

Filing Fee Calculation

\$ _____

- C. ☐ Plant application
(\$480.00—37 C.F.R. § 1.16(g))

Filing fee calculation

\$ _____

11. Small Entity Statement(s)

- ☐ Statement(s) that this is a filing by a small entity under 37 C.F.R. § 1.9 and 1.27 is (are) attached.

WARNING: "Status as a small entity must be specifically established in each application or patent in which the status is available and desired. Status as a small entity in one application or patent does not affect any other application or patent, including applications or patents which are directly or indirectly dependent upon the application or patent in which the status has been established. The refiling of an application under § 1.53 as a continuation, division, or continuation-in-part (including a continued prosecution application under § 1.53(d)), or the filing of a reissue application requires a new determination as to continued entitlement to small entity status for the continuing or reissue application. A nonprovisional application claiming benefit under 35 U.S.C. § 119(e), 120, 121, or 365(c) of a prior application, or a reissue application may rely on a statement filed in the prior application or in the patent if the nonprovisional application or the reissue application includes a reference to the statement in the prior application or in the patent or includes a copy of the statement in the prior application or in the patent and status as a small entity is still proper and desired. The payment of the small entity basic statutory filing fee will be treated as such a reference for purposes of this section." 37 C.F.R. § 1.28(a)(2).

WARNING: "Small entity status must not be established when the person or persons signing the . . . statement can **unequivocally** make the required self-certification." M.P.E.P., § 509.03, 6th ed., rev. 2, July 1996 (*emphasis added*).

(complete the following, if applicable)

- ☐ Status as a small entity was claimed in prior application
_____ / _____, filed on _____, from which benefit
is being claimed for this application under:

35 U.S.C. § ☐ 119(e),
☐ 120,
☐ 121,
☐ 365(c),

and which status as a small entity is still proper and desired.

- ☐ A copy of the statement in the prior application is included.

Filing Fee Calculation (50% of A, B or C above)

\$ _____

NOTE: Any excess of the full fee paid will be refunded if small entity status is established and a refund request are filed within 2 months of the date of timely payment of a full fee. The two-month period is not extendable under § 1.136. 37 C.F.R. § 1.28(a).

12. Request for International-Type Search (37 C.F.R. § 1.104(d))

(complete, if applicable)

- ☐ Please prepare an international-type search report for this application at the time when national examination on the merits takes place.

13. Fee Payment Being Made at This Time

☐ Not Enclosed

☐ No filing fee is to be paid at this time.

(This and the surcharge required by 37 C.F.R. § 1.16(e) can be paid subsequently.)

☒ Enclosed

☒ Filing fee \$ 780.00

☐ Recording assignment
(\$40.00; 37 C.F.R. § 1.21(h))
(See attached "COVER SHEET FOR
ASSIGNMENT ACCOMPANYING NEW
APPLICATION".) \$ _____

☐ Petition fee for filing by other than all the
inventors or person on behalf of the inventor
where inventor refused to sign or cannot be
reached
(\$130.00; 37 C.F.R. §§ 1.47 and 1.17(l)) \$ _____

☐ For processing an application with a
specification in
a non-English language
(\$130.00; 37 C.F.R. §§ 1.52(d) and 1.17(k)) \$ _____

☐ Processing and retention fee
(\$130.00; 37 C.F.R. §§ 1.53(d) and 1.21(l)) \$ _____

☐ Fee for international-type search report
(\$40.00; 37 C.F.R. § 1.21(e)) \$ _____

NOTE: 37 C.F.R. § 1.21(l) establishes a fee for processing and retaining any application that is abandoned for failing to complete the application pursuant to 37 C.F.R. § 1.53(f) and this, as well as the changes to 37 C.F.R. §§ 1.53 and 1.78(a)(1), indicate that in order to obtain the benefit of a prior U.S. application, either the basic filing fee must be paid, or the processing and retention fee of § 1.21(l) must be paid, within 1 year from notification under § 53(f).

Total fees enclosed \$ 780.00

14. Method of Payment of Fees

☒ Check in the amount of \$ 780.00

☐ Charge Account No. _____ in the amount of
\$ _____.

A duplicate of this transmittal is attached.

NOTE: Fees should be itemized in such a manner that it is clear for which purpose the fees are paid. 37 C.F.R. § 1.22(b).

15. Authorization to Charge Additional Fees

WARNING: If no fees are to be paid on filing, the following items should not be completed.

WARNING: Accurately count claims, especially multiple dependent claims, to avoid unexpected high charges, if extra claim charges are authorized.

- ☒ The Commissioner is hereby authorized to charge the following additional fees by this paper and during the entire pendency of this application to Account No. 19-0737.

☒ 37 C.F.R. § 1.16(a), (f) or (g) (filing fees)

☒ 37 C.F.R. § 1.16(b), (c) and (d) (presentation of extra claims)

NOTE: Because additional fees for excess or multiple dependent claims not paid on filing or on later presentation must only be paid or these claims cancelled by amendment prior to the expiration of the time period set for response by the PTO in any notice of fee deficiency (37 C.F.R. § 1.16(d)), it might be best not to authorize the PTO to charge additional claim fees, except possibly when dealing with amendments after final action.

☐ 37 C.F.R. § 1.16(e) (surcharge for filing the basic filing fee and/or declaration on a date later than the filing date of the application)

☐ 37 C.F.R. § 1.17(a)(1)-(5) (extension fees pursuant to § 1.136(a)).

☐ 37 C.F.R. § 1.17 (application processing fees)

NOTE: ". . . A written request may be submitted in an application that is an authorization to treat any concurrent or future reply, requiring a petition for an extension of time under this paragraph for its timely submission, as incorporating a petition for extension of time for the appropriate length of time. An authorization to charge all required fees, fees under § 1.17, or all required extension of time fees will be treated as a constructive petition for an extension of time in any concurrent or future reply requiring a petition for an extension of time under this paragraph for its timely submission. Submission of the fee set forth in § 1.17(a) will also be treated as a constructive petition for an extension of time in any concurrent reply requiring a petition for an extension of time under this paragraph for its timely submission." 37 C.F.R. § 1.136(a)(3).

☐ 37 C.F.R. § 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 C.F.R. § 1.311(b))

NOTE: Where an authorization to charge the issue fee to a deposit account has been filed before the mailing of a Notice of Allowance, the issue fee will be automatically charged to the deposit account at the time of mailing the notice of allowance. 37 C.F.R. § 1.311(b).

NOTE: 37 C.F.R. § 1.28(b) requires "Notification of any change in status resulting in loss of entitlement to small entity status must be filed in the application . . . prior to paying, or at the time of paying, . . . the issue fee. . . ." From the wording of 37 C.F.R. § 1.28(b), (a) notification of change of status must be made even if the fee is paid as "other than a small entity" and (b) no notification is required if the change is to another small entity.

16. Instructions as to Overpayment

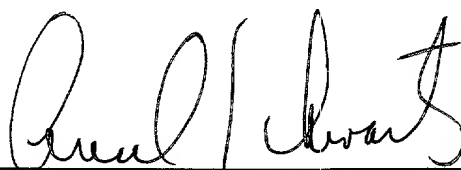
NOTE: "... Amounts of twenty-five dollars or less will not be returned unless specifically requested within a reasonable time, nor will the payer be notified of such amounts; amounts over twenty-five dollars may be returned by check or, if requested, by credit to a deposit account." 37 C.F.R. § 1.26(a).

- ☒ Credit Account No. 19-0737
- ☐ Refund

Reg. No. 30,587

Tel. No. (412) 621-9222

Customer No.



SIGNATURE OF PRACTITIONER

Ansel M. Schwartz

(type or print name of attorney)

One Sterling Plaza
201 N. Craig Street

P.O. Address

Suite 304
Pittsburgh, PA 15213

☐ **Incorporation by reference of added pages**

(check the following item if the application in this transmittal claims the benefit of prior U.S. application(s) (including an international application entering the U.S. stage as a continuation, divisional or C-I-P application) and complete and attach the ADDED PAGES FOR NEW APPLICATION TRANSMITTAL WHERE BENEFIT OF PRIOR U.S. APPLICATION(S) CLAIMED)

- ☐ Plus Added Pages for New Application Transmittal Where Benefit of Prior U.S. Application(s) Claimed

Number of pages added _____

- ☐ Plus Added Pages for Papers Referred to in Item 4 Above

Number of pages added _____

- ☐ Plus added pages deleting names of inventor(s) named in prior application(s) who is/are no longer inventor(s) of the subject matter claimed in this application.

Number of pages added _____

- ☐ Plus "Assignment Cover Letter Accompanying New Application"

Number of pages added _____

☒ **Statement Where No Further Pages Added**

(if no further pages form a part of this Transmittal, then end this Transmittal with this page and check the following item)

- ☒ This transmittal ends with this page.

SWITCH NAME, IP ADDRESS, AND HARDWARE SERIAL NUMBER
AS PART OF THE TOPOLOGY DATABASE

FIELD OF THE INVENTION

The present invention is related to network management
5 with the use of a topology database. More specifically, the
present invention is related to network management with the use of
a topology database having configuration information.

BACKGROUND OF THE INVENTION

Network management can be simplified by having all
10 network configuration information accessible from a single
location. Current implementations do not provide any such
repository for several types of important data, such as switch name
or switch IP address. An administrator, or automated
administrative data collection task, is therefore required to
15 establish a connection with each individual switch to query for the
information. In large networks, this quickly becomes a cumbersome
procedure.

Information stored in the Topology Database (TDB) is
shared between all switches in a PNNI peer group (a logical
20 collection of switches). Therefore, if switches place their
configuration information in the TDB, all other switches in the
PNNI peer group will have access to it as well. The network
administrator will then be able to retrieve the relevant data for
all of the switches in the peer group from a single location.

SUMMARY OF THE INVENTION

The present invention pertains to a switch of a network. The switch comprises a topology database having configuration information. The switch comprises a mechanism for sending the configuration information from the topology database to the network and for receiving configuration information from the network and storing it in the topology database.

The present invention pertains to a telecommunications system. The system comprises S switches, where S is an integer greater than or equal to 2. Each switch has a topology data base with all configuration information of the S switches, any one switch providing all the configuration information for all of the S switches.

The present invention pertains to a method for operating a telecommunications network. The method comprises the steps of placing configuration information of a first switch of the network into a topology database of the first switch. Then there is the step of propagating the configuration information of the first switch to a second switch of the network.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings, the preferred embodiment of the invention and preferred methods of practicing the invention are illustrated in which:

5 Figure 1 is a schematic representation of a system of the present invention.

Figure 2 is a schematic representation of a switch of the present invention.

DETAILED DESCRIPTION

10 Referring now to the drawings wherein like reference numerals refer to similar or identical parts throughout the several views, and more specifically to figures 1 and 2 thereof, there is shown a switch 10 of a network 12. The switch 10 comprises a topology database 14 having configuration information 16. The
15 switch 10 comprises a mechanism for sending the configuration information 16 from the topology database 14 to the network 12 and for receiving configuration information 16 from the network 12 and storing it in the topology database 14.

20 Preferably, the sending and receiving mechanism 18 includes a switch agent 20 for receiving configuration information 16 from the network 12. The switch agent 20 preferably looks up in

the topology database 14 and returns requested information of an SNMP query from the network 12. Preferably, the switch agent 20 forms an SNMP query to the network 12.

The topology database 14 preferably has all configuration information 16 of the network 12. Preferably, the configuration information 16 includes the name 22 of the switch 10. The configuration information 16 preferably includes an IP address 24 of the switch 10. Preferably, the configuration information 16 includes a software version 26 of the switch 10. The configuration information 16 preferably includes hardware type 28 of the switch 10. Preferably, the configuration information 16 includes a unique ID 30 of the switch 10. The configuration information 16 preferably includes a remote node index 32 of the switch 10. Preferably, the configuration information 16 includes nodal flags 34 of the switch 10. The configuration information 16 preferably includes an interface name 36 for the address of the switch 10.

The present invention pertains to a telecommunications system 38. The system 38 comprises S switches 10, where S is an integer greater than or equal to 2. Each switch 10 has a topology database 14 with all configuration information 16 of the S switches 10, any one switch 10 providing all the configuration information 16 for all of the S switches 10.

Preferably, the switches 10 send configuration information 16 to each other. The switches 10 preferably send SNMP

queries to each other to return retrieved configuration information 16 from each other, and the switches 10 respond to the SNMP queries by sending the requested configuration information 16 to the other switches 10 which sent the SNMP queries. Preferably, the switches 5 10 attach a systems information group to a nodal information group to propagate the configuration information 16 to the other switches in response to an SNMP query.

The switches 10 preferably have one or more logical nodes 40. Preferably, the nodes 40 form a first PNNI peer group 42. The system 38 preferably includes a plurality of PNNI peer groups 44. Preferably, any node of the first PNNI peer group 42 can provide all the configuration information 16 for the first PNNI peer group 42.

The present invention pertains to a method for operating a telecommunications network 12. The method comprises the steps of placing configuration information 16 of a first switch of the network 12 into a topology database 14 of the first switch. Then there is the step of propagating the configuration information 16 of the first switch to a second switch of the network 12.

Preferably, the first and second switches are in a PNNI peer group, and after the propagating step there is the step of retrieving configuration information 16 for all the switches in the PNNI peer group from the first switch. Before the propagating step there is preferably the step of sending an SNMP query from the

second switch to the first switch for configuration information 16 in the topology data base of the first switch.

Preferably, the propagating step includes the steps of attaching a system information group having the configuration information 16 from the topology data base of the first switch requested by the SNMP query to a nodal information group. Then there is the step of propagating the system information group attached to the nodal information group to the second switch.

In the operation of the preferred embodiment, all switches in a network 12 running the PNNI protocol contains one or more logical nodes 40. Each node can be considered a separate switching entity. A number of nodes 40 may be contained within a PNNI peer group, which is a collection of logical nodes 40 that maintain identical topology information via the flooding protocol.

The flooding protocol is used to distribute information from one switch to the other switches in its PNNI peer group. The information is contained in standard formats. These information group (IG) formats are specified by the standard, so that switches from different vendors can interoperate.

One IG, the System Capabilities IG, is structured to allow switches to store proprietary information within the IG without affecting the ability of the switch 10 to interoperate. In

addition, these IGs may be attached to any other IG used in the protocol.

10 All nodes 40 in PNNI must flood a Nodal Information IG, which stores required information about a particular logical node.
5 Thus, all nodes 40 in a PNNI peer group will have a Nodal Information IG from every other logical node in the same peer group.

10 By attaching a System Capabilities IG to the Nodal Information IG, any information placed in the System Capabilities IG will be flooded to every other node in the PNNI peer group. Therefore, the desired switch information can be propagated to other switches by placing it into a System Capabilities IG attached to the Nodal Information IG of all of the logical nodes 40 within the switch 10.

15 One current method to retrieve information from the TDB is to perform an SNMP query to the switch 10. The switch agent 20 receives the SNMP query, and then looks up and returns the requested information. The switch agent 20 has direct access to the TDB, and can therefore obtain the switch configuration
20 information 16.

Thus, using SNMP queries to a single switch, a user can obtain the configuration information 16 of any switch in the same PNNI peer group. Because all nodes 40 in a network 12 must have

globally unique identifiers, the Node ID's are long and difficult to remember. In PNNI, for example, a typical node ID 30 is:

Node: 80:160:47.0000000000ae1e1e1e1e20dc.ff1a20dc0001.00

In a default PNNI implementation, there is no further information available to identify a remote node except for its Node ID 30. By flooding the switch configuration information 16 with the nodal information, it becomes possible to map the node ID 30 to a more human friendly form. In particular, the node can be specified by the switch it resides on, and the node index 32 of the node on that switch. The previous example could now be listed as:

Node: lab-switch-20 (2)

On-switch configuration menus could use this notation to make node listing much more informative to the user.

It should be pointed out that because the PNNI flooding protocol is used to transmit the information, the extent that information can be shared depends on the limitations of the protocol. That is, switch configuration information 16 is only available for those switches that are known to a switch through PNNI topology database 14 exchange.

Using the PNNI topology database 14 to store switch configuration information 16 has several advantages. PNNI provides

the System Capability Group (IG) as a method to distribute proprietary information in a standards-compliant way. Using the topology database (TDB) allows switches to leverage the standard PNNI flooding protocol to distribute information without the need
5 for additional proprietary protocols.

Switches that include system configuration information 16 (such as IP addresses) in the system capabilities IG will operate seamlessly with switches that do not. If a switch does not understand the information, it will pass the IG on to other
10 switches that do. Additionally, there are existing procedures in place to retrieve information from the TDB, which provides for rapid implementation of the invention.

A network 12 administrator commonly accesses other information stored in the TDB. The new switch information can
15 therefore be retrieved using an existing and familiar interface.

Configuration Information Stored in the TDB for Each Remote Switch

1. Switch software version
2. Switch hardware type
3. Switch Unique ID (usually a hardware serial number)
- 20 4. Remote Node Index (an integer, usually under 10)
5. FORE Nodal Flags (proprietary routing information)
6. Switch Name (text, e.g. "labswitch35" or "asx4000-2")
7. For each IP address 24 on the switch, the following:

- The interface name for the address (e.g. 'ie0')
- The actual IP address 24 (e.g. 192.34.98.34)

Abbreviations Used:

5 PNNI: Private Network-Network Interface, or
Private Network Node Interface

TDB: Topology database

IG: Information group

SNMP: Simple network management protocol

10 In summary, this system 38 provides the desired
information with no disruption to the network 12, minimal need for
additional implementation, and no significant modifications to
existing discovery mechanisms.

15 Although the invention has been described in detail in
the foregoing embodiments for the purpose of illustration, it is to
be understood that such detail is solely for that purpose and that
variations can be made therein by those skilled in the art without
departing from the spirit and scope of the invention except as it
may be described by the following claims.

WHAT IS CLAIMED IS:

1. A switch of a network comprising:

a topology database having configuration information; and

a mechanism for sending the configuration information from the topology database to the network and for receiving configuration information from the network and storing it in the topology database.

2. A switch as described in Claim 1 wherein the sending and receiving mechanism include a switch agent for receiving configuration information from the network.

3. A switch as described in Claim 2 wherein the switch agent looks up in the topology database and returns requested information of an SNMP query from the network.

4. A switch as described in Claim 3 wherein the switch agent forms an SNMP query to the network.

5. A switch as described in Claim 4 wherein the topology database has all configuration information of the network.

6. The switch as described in Claim 5 wherein the configuration information includes the name of the switch.

7. A switch as described in Claim 6 wherein the configuration information includes an IP address of the switch.

8. A switch as described in Claim 7 wherein the configuration information includes a software version of the switch.

9. A switch as described in Claim 8 wherein the configuration information includes hardware type of the switch.

10. A switch as described in Claim 9 wherein the configuration information includes a unique ID of the switch.

11. A switch as described in Claim 10 wherein the configuration information includes a remote node index of the switch.

12. A switch as described in Claim 11 wherein the configuration information includes nodal flags of the switch.

13. A switch as described in Claim 12 wherein the configuration information includes an interface name for the address of the switch.

14. A telecommunications system comprising:

S switches, where S is an integer greater than or equal to 2, each switch having a topology database with all configuration information of the S switches, any one switch providing all the configuration information for all of the S switches.

15. A system as described in Claim 14 wherein the switches send configuration information to each other.

16. A system as described in Claim 15 wherein the switches send SNMP queries to each other to return retrieved configuration information from each other, and the switches respond to the SNMP queries by sending the requested configuration information to the other switches which sent the SNMP queries.

17. A system as described in Claim 16 wherein the switches attach a systems information group to a nodal information group to propagate the configuration information to the other switches in response to an SNMP query.

18. A system as described in Claim 17 wherein the switches have one or more logical nodes.

19. A system as described in Claim 18 wherein the nodes form a first PNNI peer group.

20. A system as described in the Claim 19 including a plurality of PNNI peer groups.

21. A system as described in Claim 20 wherein any node of the first PNNI peer group can provide all the configuration information for the first PNNI peer group.

22. A method for operating a telecommunications network comprising the steps of:

placing configuration information of a first switch of the network into a topology database of the first switch; and

propagating the configuration information of the first switch to a second switch of the network.

23. A method as described in Claim 22 wherein the first and second switches are in a PNNI peer group, and after the propagating step, there is the step of retrieving configuration information for all the switches in the PNNI peer group from the first switch.

24. A method as described in Claim 23 wherein before the propagating step, there is the step of sending an SNMP query from the second switch to the first switch for configuration information in the topology data base of the first switch.

25. A method as described in Claim 24 wherein the propagating step includes the steps of attaching a system information group having the configuration information from the

[illegible]

ABSTRACT OF THE DISCLOSURE

SWITCH NAME, IP ADDRESS, AND HARDWARE SERIAL NUMBER
AS PART OF THE TOPOLOGY DATABASE

A switch of a network. The switch includes a topology database having configuration information. The switch includes a mechanism for sending the configuration information from the topology database to the network and for receiving configuration information from the network and storing it in the topology database. A telecommunications system. A method for operating a telecommunications network.

FIG. 1 is a block diagram of a switch 10 according to one embodiment of the present invention. The switch 10 includes a topology database 14, a configuration information 16, a sending and receiving mechanism 18, and a switch agent 20. The topology database 14 includes a name 22, an IP address 24, a software version 26, a hardware type 28, an ID 30, a node index 32, a nodal flags 34, and an interface name 36.

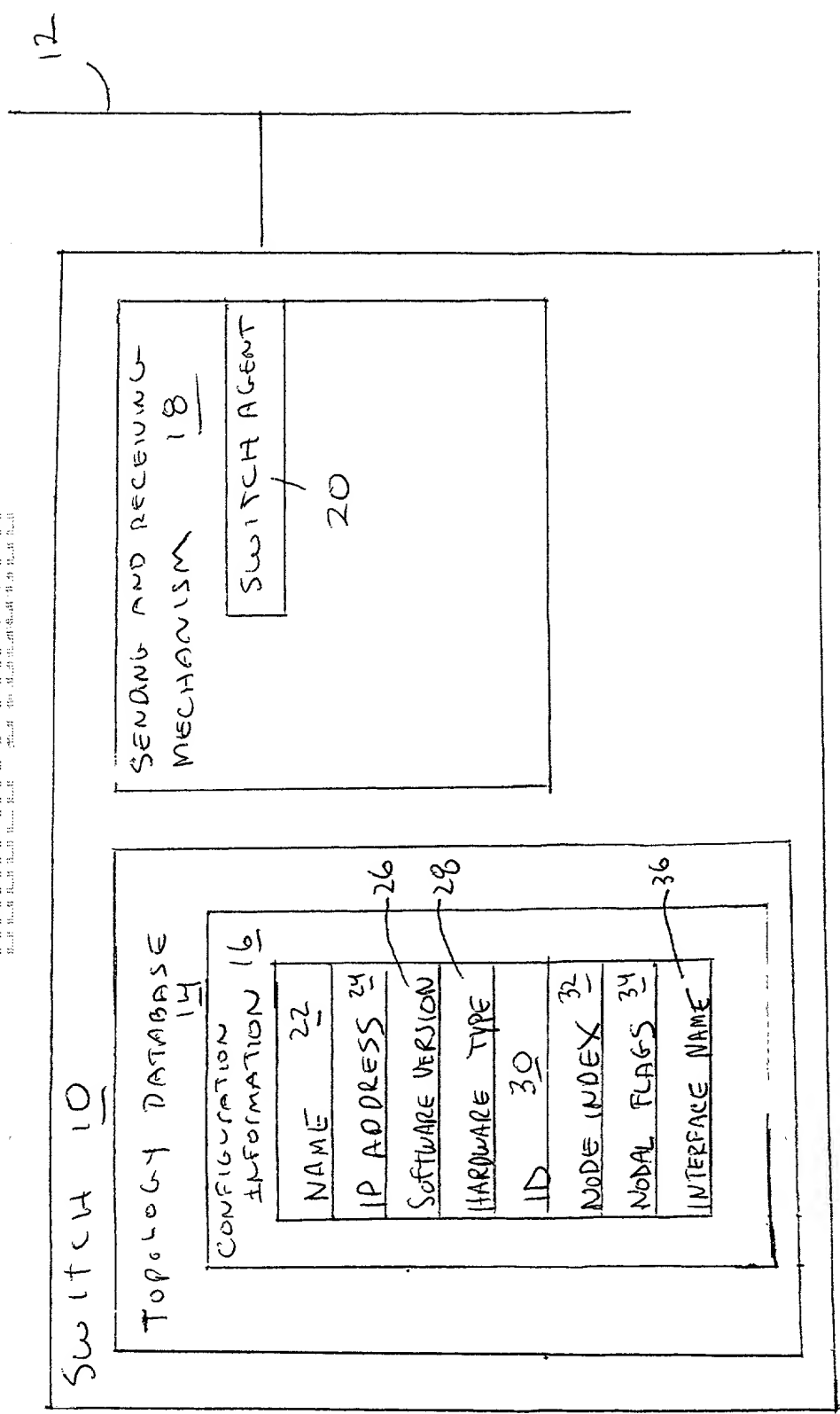


FIG. 1

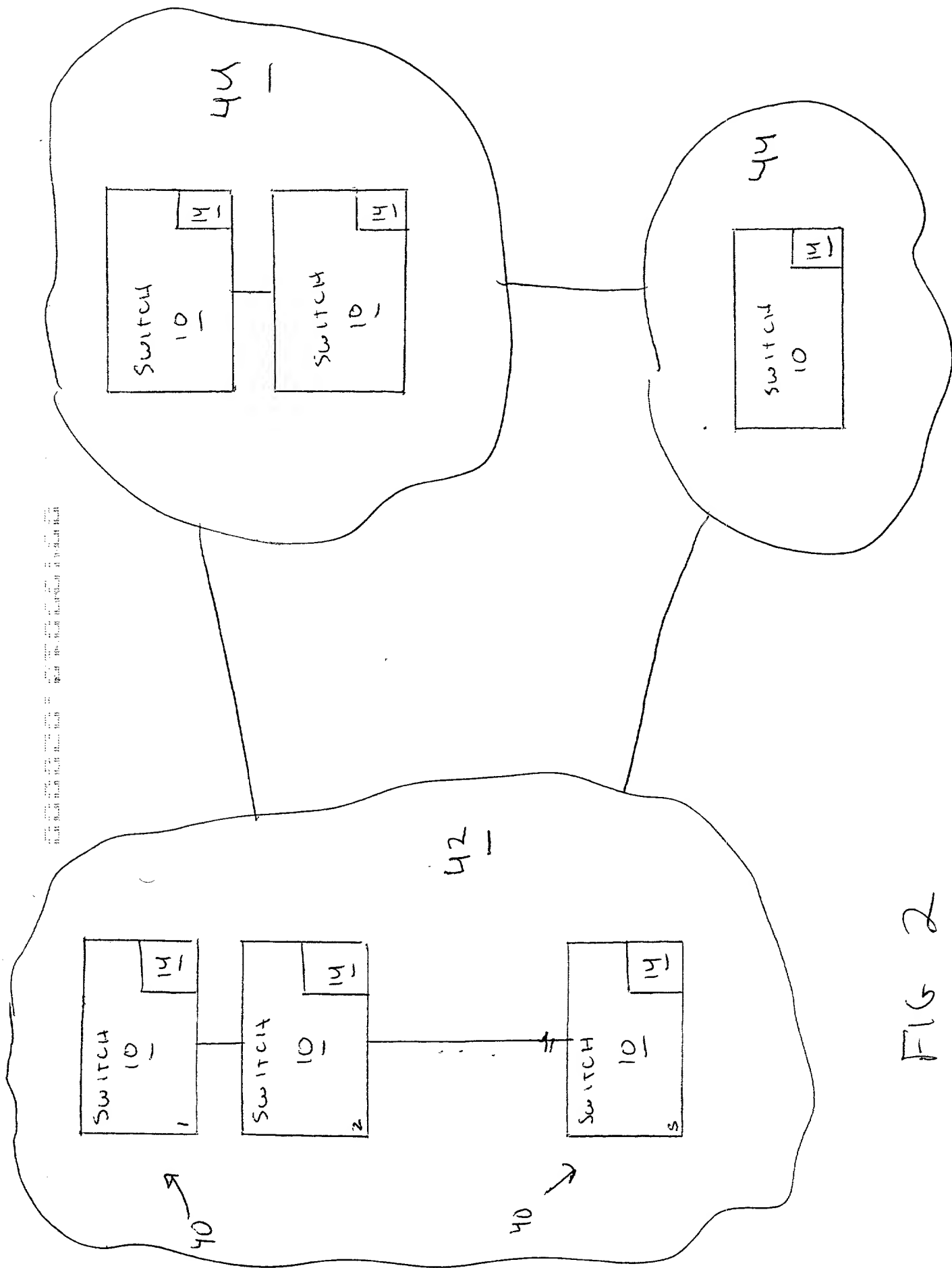


FIG 2